

Improvements and Additions to NASA Near Real-Time Earth Imagery

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OVERVIEW

What is LANCE?

The **L**and, **A**tmosphere **N**ear real-time **C**apability for **E**OS (LANCE) provides expedited access to near real-time data and imagery from these instruments:

• **AIRS** • **AMS2** • **MISR** • **MLS** • **MODIS** • **OMI** • **VIIRS**

Near real-time products support application users interested in monitoring a wide variety of natural and man-made phenomena:



• **Air Quality** • **Dust storms** • **Fires monitoring** • **Floods**
• **Ash Plumes** • **Vegetation for agricultural** • **Drought**
• **Smoke Plumes** • **Sea Ice for shipping** • **Severe Storms**

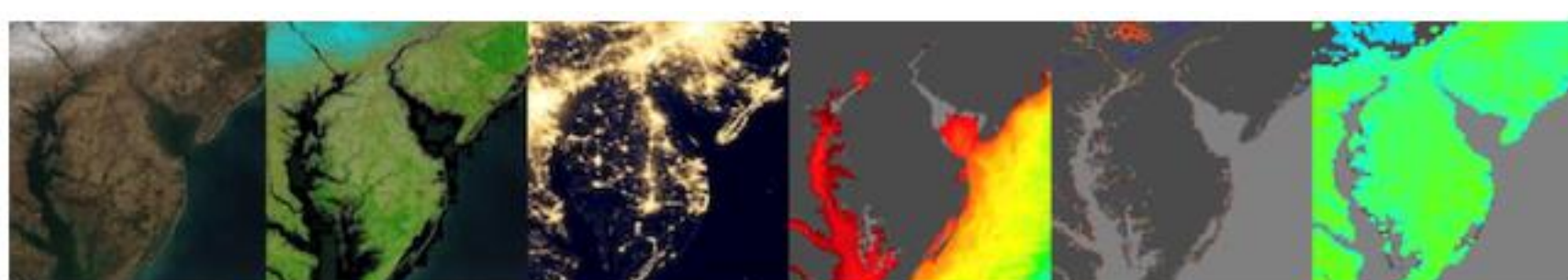
Most data products are available for access directly from the processing system within 3 hours of satellite observation. Imagery products are available through the GIBS API and Worldview and Website within 3-5 hours of observation.

LANCE is a component of EOSDIS, NASA's Earth Observing System Data and Information System. It is a virtual system that leverages existing science led data centers.

<https://earthdata.nasa.gov/lance>

What is GIBS?

The **G**lobal **I**magery **B**rowse **S**ervices (GIBS) provides full resolution imagery representations of NASA Earth science data in a free, open, and interoperable manner. Through responsive and highly available web services, it enables interactive exploration of data to support a wide range of applications including scientific research, applied sciences, natural hazard monitoring, and outreach.



GIBS provides quick access to 200+ satellite imagery products, covering every part of the world. Most imagery is available with a few hours after satellite overpass and some products span over 15 years.

<https://earthdata.nasa.gov/gibs>

What is Worldview?

The Worldview tool provides the capability to interactively browse global, full-resolution satellite imagery hosted by the GIBS system. Users may view imagery based on a curated list of current natural events, including wildfires, tropical storms, and volcanic eruptions. Users may also choose to download the raw data files underlying the imagery.

Browsing on tablet and smartphone devices is generally supported for mobile access to the imagery.

<https://earthdata.nasa.gov/worldview>

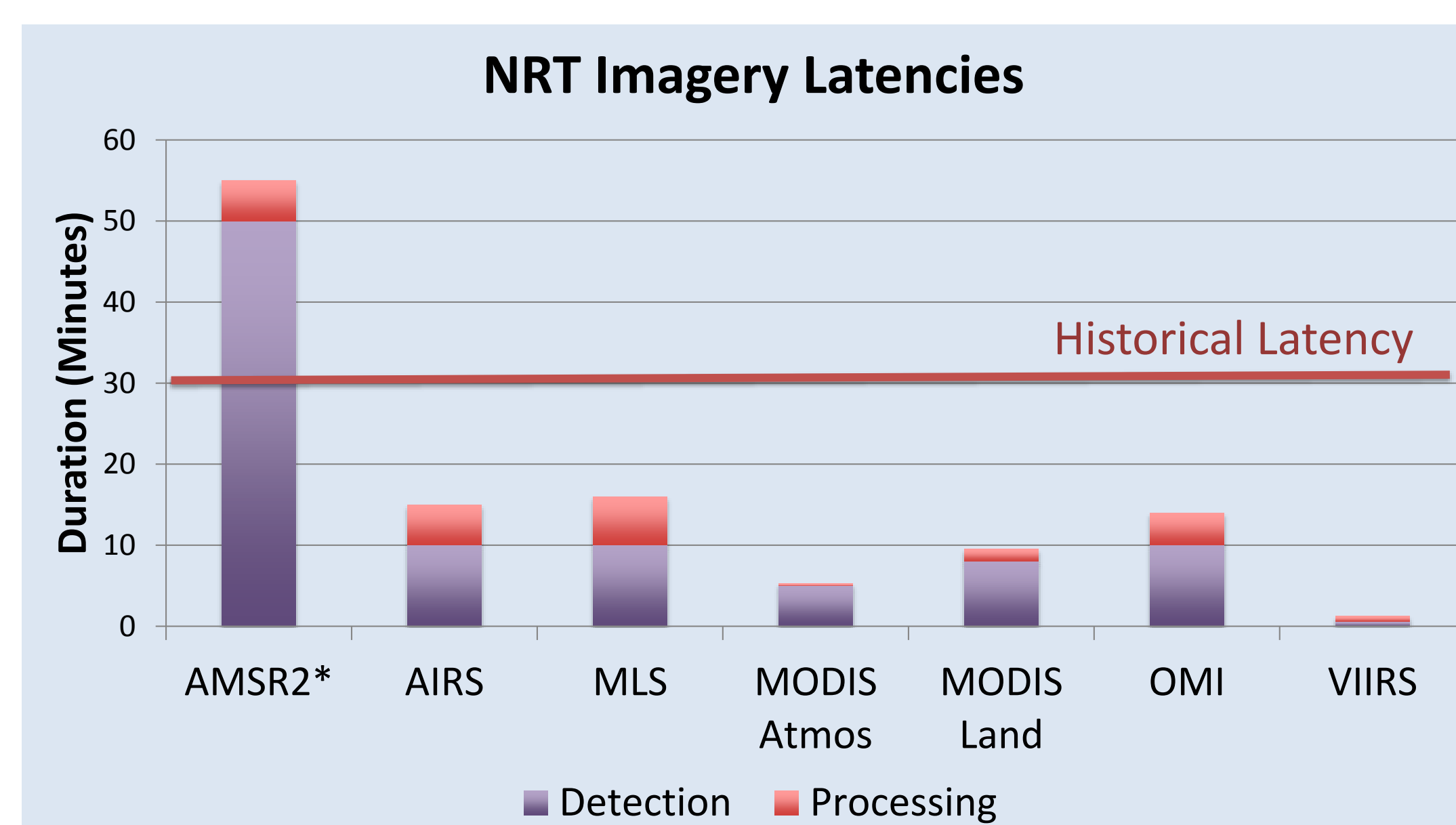
NEW FEATURES

Processing Latency

Historically, the GIBS system detected and processed Near Real-Time imagery on a **30-minute** cycle. This duration was dependent on the longest-running process. As such, updates to many products were unnecessarily delayed. For higher resolution products (e.g. MODIS Corrected Reflectance), processing durations increased throughout the day as larger portions of the world were covered.

During 2016, the GIBS team implemented software improvements to address the following latencies. Results are shown in the subsequent graph.

- **Detection** – The amount of time between imagery files being available for download and the GIBS system's detecting them.
- **Processing** – The amount of time between imagery files being detected and when they are available for access via the GIBS imagery services.

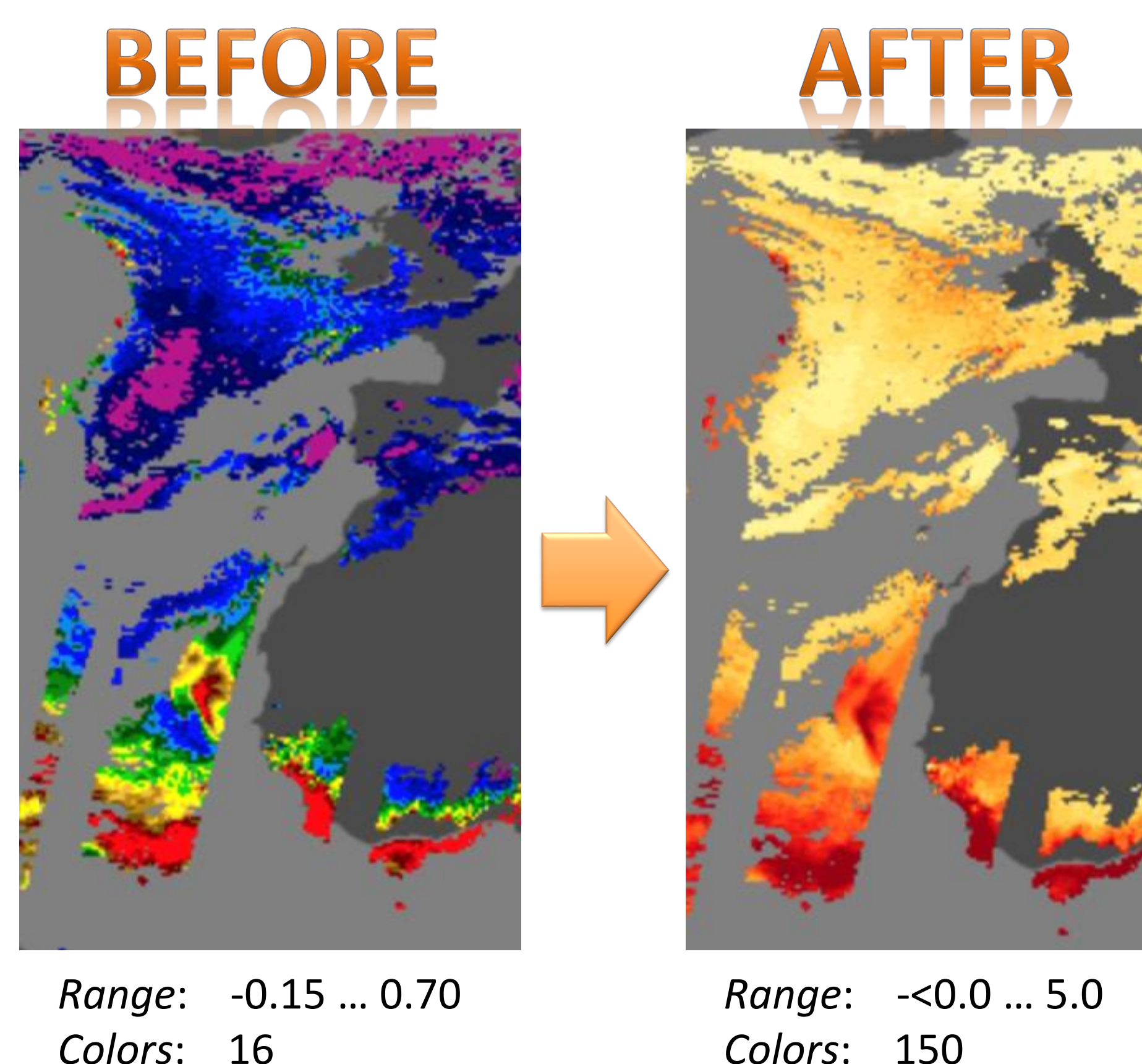


* - High detection latency due to software configuration.

Data Scaling -> Imagery Palettes

A key aspect to the GIBS imagery products is the method whereby science data products are “scaled” to map data values and ranges to specific RGB colors. This process must take into account the possible and likely min/max data ranges and utilize color palettes that draw out these features within a mapping client (e.g. Worldview).

During 2016, the GIBS team worked closely with many of its Near Real-Time imagery providers to review and update the data scaling approaches which resulted in numerous improvements to GIBS imagery products. An example is shown below:



NEW PRODUCTS

MODIS Collection 6

We have worked closely with the MODIS science team to introduce numerous new Near Real-Time products based on the recently release MODIS Collection 6 archive record.

Atmosphere

- **Cloud Top Height** • **Cloud Effective Radius**
- **Cloud Optical Thickness & Properties** • **Cloud Fraction**
- **Cloud Water Path** • **Cloud Phase Infrared**
- **Merged & Deep Blue & Dark Target AOD**
- **Dark Target & Deep Blue Aerosol Angstrom Exponent**

Land

- **Snow Cover (NDSI)** • **Ice Surface Temperature**
- **NDVI** • **Enhanced Vegetation Index**



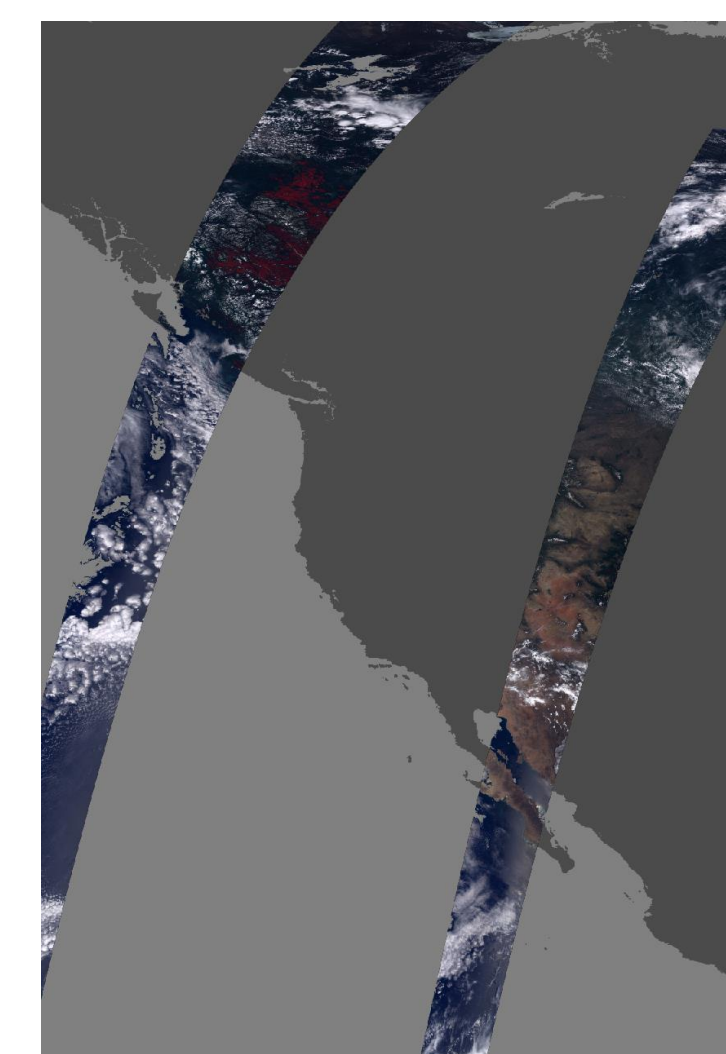
MODIS Terra 8-Day NDVI

MISR Radiance (Coming Soon)

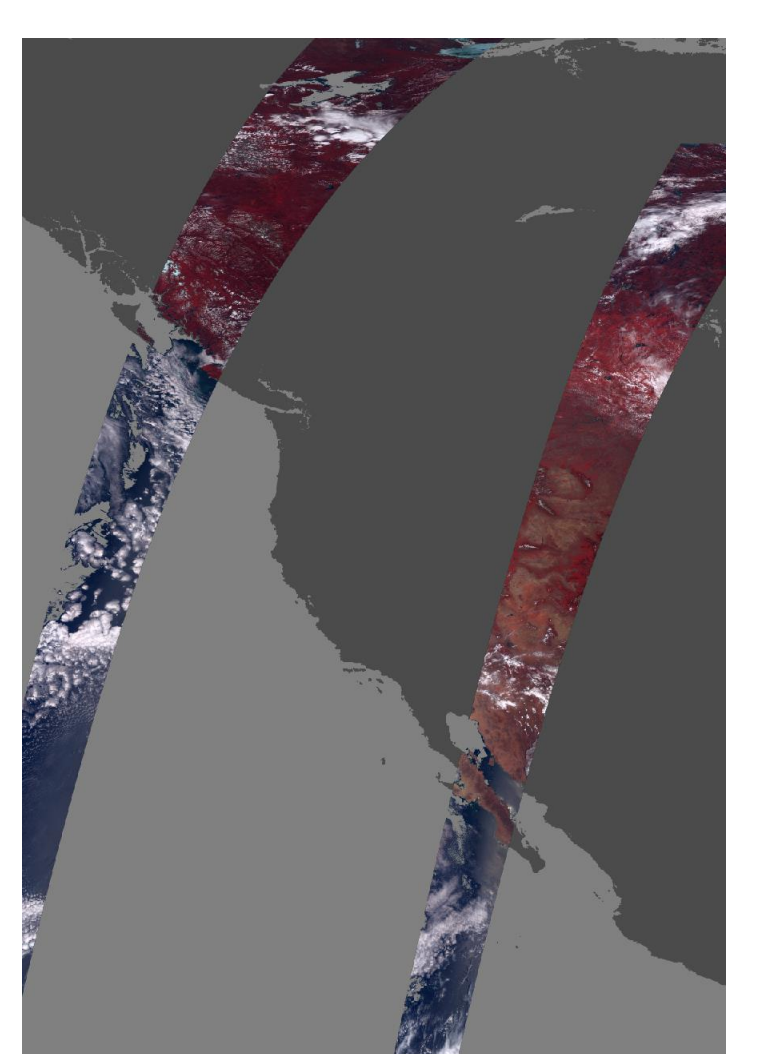
The MISR instrument is a recent addition to the LANCE system. Near Real-Time imagery is currently available and imagery products visualizing the following Color Radiance cameras will soon be available in GIBS.

RGB & NGB

- **AA** • **AF** • **AN** • **BA** • **BF** • **CA** • **CF** • **DA** • **DF**



RGB Camera AN



NGB Camera AN

VIIRS Day/Night Band (Coming Soon)

In 2012, GIBS released its popular “Earth at Night” static imagery layer based on data captured by the VIIRS instrument. GIBS will soon be releasing a Near Real-Time daily product visualizing the VIIRS day/night band.

GMI / IMERG (Coming Soon)

GIBS will soon add the following Near Real-Time companion products to its existing science-data based visualizations for the GMI instrument. Additionally, imagery products will be added for data products based on the IMERG algorithm.

- **Rain Rate** • **Snow Rate** • **Brightness Temperature**

AMS2 Land (Coming Soon)

GIBS will soon add the following Near Real-Time products to the existing Ocean, Rain, Sea Ice, and Snow parameters:

- **Soil Moisture (Normal Polarized Difference)**
- **Soil Moisture (Single Channel Algorithm Temperature)**

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